

AMENDMENTS

IN THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application. Please amend claims 1, 8, 21, and 28 as shown below.

1. (currently amended): A ribbon beam ion implantation system comprising:
an ion source operable to generate multiple ion species from a source material;
an extraction system configured to extract the ion species from the ion source
and generate a ribbon-shaped ion beam; and
a mass analyzer comprised of a first permanent magnet and a second
permanent magnet and without electromagnets that generates a substantially uniform
magnetic field across a beam path of the ribbon-shaped ion beam to select a species
from the multiple species initially present in the ribbon-shaped ion beam.
2. (original): The system of claim 1, further comprising an acceleration system
aligned along the beam path that operates on the ion beam after the mass analyzer and
accelerates or decelerates the ion beam to a predetermined implantation energy level.
3. (original): The system of claim 1, wherein the extraction system is a triode
extraction system operative to produce a converging beam.
4. (previously presented): The system of claim 1, wherein the ion beam extracted
by the extraction system is at a low energy.
5. (previously presented): The system of claim 4, wherein the low energy is about
500 eV.
6. (original): The system of claim 1, wherein the magnetic field generated by the
mass analyzer has a length of about 5 cm through which the ion beam travels.

7. (original): The system of claim 1, wherein the magnetic field is oriented along the ribbon-shaped ion beam's short dimension.
8. (currently amended): The system of claim 1, wherein the magnetic field is relatively high with rapidly decaying fringes.
9. (original): The system of claim 1, wherein the multiple species include B⁺, F⁺, BF₁⁺ and BF₂⁺, and the selected species is B⁺ or BF₂⁺.
10. (original): The system of claim 1, wherein the multiple species include P⁺ and H⁺ and the selected species is P⁺.
11. (original): The system of claim 1, wherein the source material comprises boron trifluoride (BF₃).
12. (original): The system of claim 1, wherein the source material comprises phosphorous pentafluoride (PF₅).
13. (original): The system of claim 1, wherein the source material comprises arsenate (As₅).
14. (original): The system of claim 1, wherein the ion beam has a width of about 300 mm.
15. (original): The system of claim 1, further comprising an end station having a wafer, wherein the ion beam is operative to implant the selected species on the wafer in a single pass.

16. (original): The system of claim 1, wherein the extraction system comprises a control circuit operable to receive one or more inputs indicative of a desired ion species, and output a set of predetermined voltages for electrodes associated with the extraction system based on the one or more inputs.

17. (original): The system of claim 16, wherein the set of predetermined voltages dictates an extraction energy of the ribbon-shaped ion beam entering the mass analyzer.

Claims 18-20 (canceled)

21. (currently amended): A method of generating a ribbon type ion beam comprising:

generating multiple ion species from an ion source;

extracting the multiple ion species to form a ribbon-shaped ion beam having a short dimension and a wide dimension, wherein the wide dimension is substantially larger than the short dimension; and

generating a magnetic field from only a first permanent magnet and a second permanent magnet, wherein the first permanent magnet and the second permanent magnet comprise a mass analyzer;

selecting a species and rejecting other species of the multiple species of the ion beam via ~~a permanent magnet-based~~ the magnetic field of the mass analyzer.

22. (original): The method of claim 21, further comprising accelerating/decelerating the ion beam to a desired energy level after selecting the species.

23. (original): The method of claim 21, further comprising directing the ion beam towards a target wafer at an end station.

24. (original): The method of claim 23, further comprising performing an ion implant on the target wafer with the ion beam in a single pass, wherein the target wafer has a diameter of about 300 mm and the wide dimension of the ion beam is greater than about 300 mm.
25. (original): The method of claim 21, wherein the species is selected by applying a magnetic field via permanent magnets that deflects the ion beam across its short dimension.
26. (original): The method of claim 21, wherein extracting the multiple ion species comprises:
- identifying the selected species; and
 - configuring extraction electrodes with a set of predetermined voltages such that the extracted ribbon-shaped ion beam has an energy that is a function of the identified selected species.
27. (previously presented): The system of claim 1, wherein the mass analyzer is positioned downstream of the extraction system.
28. (currently amended): The system of claim 1, wherein the generated magnetic field deflects undesired species from the beam path.
29. (previously presented): A ribbon beam ion implantation system comprising:
- an ion source that generates a plurality of ion species from a source material;
 - an extraction system that extracts the plurality of ion species from the ion source and generate a ribbon-shaped ion beam comprising a plurality of species; and
 - a mass analyzer positioned downstream of the extraction system comprised of a first permanent magnet and a second permanent magnet that generates a substantially uniform magnetic field across a beam path of the ribbon-shaped ion beam to select a species from the plurality of species present in the ribbon-shaped ion beam.